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INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	
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				First Named Inventor	Erik SHAHOIAN
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				Examiner Name	
Sheet	1	of	9	**Attorney Docket Number**	IMMR-046/02US

U.S. PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	U.S. Patent Document Number	Kind Code[2] (*if known*)	Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY
XW		6,243,078		Rosenberg	06/2001
		6,219,032		Rosenberg et al.	04/17/2001
		6,166,723		Schena et al.	12/26/2000
		6,128,006		Rosenberg	10/03/2000
		6,100,874		Schena et al.	08/08/2000
		6,088,019		Rosenberg	06/11/2000
		6,088,017		Tremblay et al.	06/11/2000
		6,078,308		Rosenberg et al.	06/20/2000
		6,037,927		Rosenberg	03/14/2000
		6,028,593		Rosenberg et al.	02/22/2000
		6,024,576		Bevirt	02/15/2000
		6,020,876		Rosenberg et al.	02/01/2000
		6,004,134		Marcus et al.	12/21/1999
		6,001,014		Ogata et al.	12/14/1999
		5,990,869		Kubica et al.	11/23/1999
		5,987,437		Nishiumi et al.	04/27/1999
		5,986,643		Harvill et al.	11/16/1999
		5,973,689		Gallery	10/26/1999
		5,959,613		Rosenberg et al.	09/28/1999
		5,956,484		Rosenberg et al.	09/21/1999
		5,956,016		Kruenzner et al.	09/21/1999
		5,944,151		Jakobs et al.	08/31/1999
		5,929,846		Rosenberg et al.	07/27/1999
		5,914,705		Johnson et al.	06/22/1999
		5,912,661		Siddiqui	06/15/1999
		5,889,670		Schuler et al.	03/30/1999
		5,880,714		Rosenberg et al.	03/09/1999
		5,844,392		Peurach et al.	12/01/1998
		5,831,408		Jacobus et al.	11/03/1998
		5,825,308		Rosenberg	10/20/1998
		5,821,921		Osborn et al.	10/13/1998
		5,808,603		Chen	09/15/1998
		5,805,140		Rosenberg et al.	09/08/1998
		5,802,353		Avila et al.	09/01/1998
		5,790,108		Salcudean et al.	08/04/1998
		5,785,630		Bobick et al.	07/28/1998
		5,784,052		Keyson	07/21/1998
		5,781,172		Engel et al.	07/14/1998
		5,771,037		Jackson	06/23/1998
		5,769,640		Jacobus et al.	06/23/1998

[1] Unique citation designation number.
[2] See attached Kinds of U.S. Patent Documents.

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XW		5,767,839		Rosenberg	06/16/1998
		5,757,358		Osga	05/26/1998
		5,755,577		Gillio	05/26/1998
		5,755,016		Sinclair et al.	06/16/1998
		5,754,023		Roston et al.	05/19/1998
		5,745,715		Pickover et al.	04/28/1998
		5,742,278		Chen et al.	04/21/1998
		5,739,811		Rosenberg et al.	04/14/1998
		5,736,978		Hasser et al.	04/07/1998
		5,734,373		Rosenberg et al.	03/31/1998
		5,731,804		Rosenberg	03/24/1998
		5,724,278		Chen et al.	04/21/1998
		5,724,106		Autry et al.	03/3/1998
		5,721,566		Rosenberg et al.	02/24/1998
		5,714,978		Yamanaka et al.	02/03/1998
		5,709,219		Chen et al.	01/20/1998
		5,694,013		Stewart et al.	12/02/1997
		5,691,898		Rosenberg eet al.	11/25/1997
		5,691,747		Amano	11/25/1997
		5,666,473		Wallace	09/09/1997
		5,666,138		Culver	09/09/1997
		5,656,901		Kurita	08/12/1997
		5,643,087		Marcus et al.	07/1997
		5,642,469		Hannaford et al.	06/24/1997
		5,629,594		Jacobus et al.	05/13/1997
		5,625,576		Massie et al.	04/29/1997
		5,596,347		Robertson et al.	01/21/1997
		5,591,082		Jensen et al.	01/07/1997
		5,589,854		Tsai	12/1996
		5,589,828		Armstrong	12/1996
		5,587,937		Massie et al.	12/24/1996
		5,583,407		Yamaguchi	12/10/1996
		5,577,981		Jarvik	11/26/1996
		5,576,727		Rosenberg et al.	11/19/1996
		5,565,887		McCambridge et al.	10/15/1996
		5,547,382		Yamasaki et al.	08/20/1996
		5,542,672		Meredith	08/06/1996
		5,530,455		Gillick et al.	06/25/1996
		5,513,100		Parker et al.	04/30/1996
		5,512,919		Araki	04/30/1996
		5,506,605		Paley	04/09/1996
		5,491,477		Clark et al.	02/13/1996
		5,473,344		Bacon et al.	12/05/1995
		5,466,213		Hogan et al.	11/14/1995
		5,459,382		Jacobus et al.	10/17/1995
		5,457,479		Cheng	10/10/1995
		5,451,924		Massimino et al.	09/1995
		5,414,337		Schuler	05/1995
		5,405,152		Katanics et al.	04/11/1995
		5,399,091		Mitsumoto	03/21/1995
		5,398,044		Hill	03/14/1995
		5,396,266		Brimhall	03/07/1995
		5,389,865		Jacobus et al.	02/14/1995
		5,381,080		Schnell et al.	01/10/1995

Examiner Signature	/Xiao Wu/	Date Considered	06/25/2006

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XW		5,355,148		Anderson	10/11/1994
		5,354,162		Burdea et al.	10/11/1994
		5,341,459		Backes	08/23/1994
		5,334,027		Wherlock	08/2/1994
		5,313,230		Venolia et al.	05/17/1994
		5,309,140		Everett, Jr. et al.	05/3/1994
		5,299,810		Pierce et al.	04/05/1994
		5,296,871		Paley	03/22/1994
		5,286,203		Fuller et al.	02/15/1994
		5,275,565		Moncrief	01/4/1994
		5,275,174		Cook	01/04/1994
		5,271,290		Fischer	12/21/1993
		5,264,768		Gregory et al.	11/23/1993
		5,240,417		Smithson et al.	08/31/1993
		5,235,868		Culver	08/17/1993
		5,223,776		Radke et al.	06/29/1993
		5,220,260		Schuler	06/15/1993
		5,212,473		Louis	05/18/1993
		5,203,563		Loper, III	04/20/1993
		5,197,003		Moncrief et al.	03/23/1993
		5,193,963		McAffee et al.	03/16/1993
		5,189,355		Larkins et al.	02/23/1993
		5,186,629		Rohen	02/16/1993
		5,185,561		Good et al.	02/09/1993
		5,184,319		Kramer	02/02/1993
		5,146,566		Hollis, Jr. et al.	09/08/1992
		5,116,180		Fung et al.	05/26/1992
		5,107,262		Cadoz et al.	04/21/1992
		5,107,080		Rosen	04/21/1992
		5,103,404		McIntosh	04/07/1992
		5,095,303		Clark et al.	03/10/1992
		5,078,152		Bond et al.	01/07/1992
		5,075,517		Ferranti et al.	12/31/1991
		5,044,956		Behensky et al.	09/03/1991
		5,038,089		Szakaly	08/06/1991
		5,035,242		Franklin et al.	07/30/1991
		5,022,407		Horch et al.	06/11/1991
		5,019,761		Draft	05/28/1991
		5,007,300		Siva	04/16/1991
		5,004,391		Burdea	04/02/1991
		4,983,901		Lehmer	01/08/1991
		4,961,038		MacMinn	10/02/1990
		4,949,119		Moncrief et al.	08/14/1990
		4,934,694		McIntosh	06/19/1990
		4,930,770		Baker	06/05/1990
		4,896,554		Culver	01/30/1990
		4,891,764		McIntosh	01/02/1990
		4,868,549		Affinito et al.	09/19/1989
		4,853,874		Iwamoto et al.	08/01/1989
		4,839,838		LaBiche et al.	06/13/1989
		4,837,734		Ichikawa et al.	06/06/1989
		4,823,634		Culver	04/25/1989
		4,800,721		Cemenska et al.	01/31/1989
		4,795,296		Jau	01/1989

Examiner Signature	/Xiao Wu/	Date Considered	06/25/2006

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XW		4,794,392		Selinko	12/27/1988
		4,794,384		Jackson	12/27/1988
		4,782,327		Kley et al.	11/01/1988
		4,713,007		Alban	12/15/1987
		4,708,656		de Vries et al.	11/24/1987
		4,706,294		Ouchida	11/10/1987
		4,689,449		Rosen	08/25/1987
		4,604,016		Joyce	08/05/1986
		4,603,284		Perzley	07/29/1986
		4,599,070		Hladky et al.	07/08/1986
		4,581,491		Boothroyd	04/08/1986
		4,560,983		Williams	12/24/1985
		4,513,235		Acklam et al.	04/23/1985
		4,477,043		Repperger	10/16/1984
		4,398,889		Lam et al.	8/16/1983
		4,236,325		Hall et al.	12/02/1980
		4,160,508		Salisbury, Jr.	7/10/1979
		3,923,166		Fletcher et al.	12/02/1975
		3,919,691		Noll	11/11/1975
		3,911,416		Feder	10/07/1975
		3,903,614		Diamond et al.	09/09/1975
		3,902,687		Hightower	09/02/1975
		3,623,064		Kagan	11/23/1971
		3,517,446		Corlyon et al.	06/30/1970
		3,497,668		Hirsch	02/24/1970
		3,220,121		Cutler	11/30/1965
		3,157,853		Hirsch	11/17/1964

FOREIGN PATENT DOCUMENTS

Examiner Initials*	Cite No.[1]	Foreign Patent Document			Name of Patentee or Applicant of Cited Document	Date of Publication of Cited Document MM-DD-YYYY	T[4]
		Office[1]	Number[2]	Kind Code[3] (if known)			
		~~EP~~	~~0 626 634~~	~~A2~~	~~Yoshiaki et al.~~	~~11/1994~~	
		~~WO~~	~~95/20788~~			~~08/03/1995~~	
		~~WO~~	~~97/20305~~			~~06/05/1997~~	
		~~WO~~	~~97/31333~~			~~08/28/1997~~	
		~~EP~~	~~0265011~~	~~A1~~		~~04/27/1988~~	
		~~EP~~	~~0607580~~	~~A1~~		~~07/27/1994~~	
		~~WO~~	~~92/00559~~			~~01/09/1992~~	
		~~WO~~	~~97/20305~~			~~06/05/1997~~	
		~~WO~~	~~00/21071~~			~~04/13/2000~~	
		~~WO~~	~~00/03319~~			~~01/20/2000~~	
		~~WO~~	~~96/28777~~			~~09/19/1996~~	
		~~WO~~	~~95/33450~~			~~11/30/1995~~	

[1] Enter Office that issued the document, by the two-letter code (WIPO Standard ST.3).
[2] For Japanese patent documents, the indication of the year of the reign of the Emperor must precede the serial number of the patent document.
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		EP	0875819	A1		04/11/1998	
		EP	0085518	A1		01/21/1983	
		WO	97/21160			06/12/1997	
		EP	0 349 086	A1	Stork Kwant B.V.	01/03/1990	
		JP	114-0381		Taito Corporation	01/13/1992	
		JP	H2-185278		Taito Corporation	07/19/1990	
		JP	H7-24147		Sega Corporation	01/27/1995	
		JP	H5-192449		Taito Corporation	08/03/1993	

OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
Examiner Initials*	Cite No.[1]	Include name of the author (in CAPITAL LETTERS), title of the article (when appropriate), title of the item (book, magazine, journal, serial, symposium, catalog, etc.), date, page(s), volume-issue number(s), publisher, city and/or country where published.	T[2]
		Minsky et al., "Feeling and Seeing: Issues in Force Display," ACM 089791-351-5/90/0005, pp. 235-242 270.	
		Iwata, Hiroo, "Artificial Reality with Force-feedback: Development of Desktop Virtual Space with Compact Master Manipulator," Computer Graphics, Vol. 24, No. 4, Aug. 1990, pp. 165-170	
		Adamatsu et al., "Multimodal Mouse: A Mouse-Type Device with Tactile and Force Display," Presence, Vol. 3, No. 1, Winter 1994, pp. 73-80	
		Hasser, C. et al., "Tactile Feedback with Adaptive Controller for a Force-Reflecting Haptic Display," Parts 1 and 2, IEEE 0-7803-3131-1, 1996, pp. 526-533	
		Hasser, C., "Tactile Feedback for a Force-Reflecting Haptic Display," School of Eng., Univ. of Dayton, Dayton, OH, 1995, pp. 1-98	
		Dennerlein et al., "Vibrotactile Feedback for Industrial Telemanipulators," 6th Annual Symp. On Haptic Interfaces for Virtual Environment and Teleoperator Systems, ASME IMECE, Nov. 1997, pp. 1-7	
		Dennerlein, Jack et al., "Commercialization of Vibrotactile Feedback for Telemanipulation and Virtual Environments," 1997, Phase I Final Report for ONR Contract N00014-96-C-0326 (not published or publicly available)	
		Atkinson et al., "Computing With Feeling," Comput. & Graphics, Vol. 2, 1977, pp. 97-103	
		Kilpatrick, "The Use Of A Kinesthetic Supplement In An Interactive Graphics System," Dept. of Computer Science, Univ. of North Carolina, Chapel Hill, 1976, pp. 1-175	
		Wiker et al. "Development of Tactile Mice for Blind Access to Computers: Importance of Stimulation Locus, Object Size, and Vibrotactile Display Resolution," Proc. of the Human Factors Society 35th Annual Meeting, 1991	
		Brooks, Jr. et al., "Project GROPE – Haptic Displays for Scientific Visualization," Computer Graphics, Vol. 24, No. 4, Aug. 1990, pp. 177-185	
		Howe et al., "Task Performance with a Dextrous Teleoperated Hand System," Proc. of SPIE, Vol. 1833, Nov. 1992	
		Rosenberg, "Perceptual Design of a Virtual Rigid Surface Contact," Armstong Lab, April 1993, pp. 1-40	
		Rosenberg, "Virtual Fixtures as Tools to Enhance Operator Performance in Telepresence Environments," SPIE Telemanipulator Technology, 1993	
		Rosenberg, "Virtual Haptic Overlays Enhance Performance in Telepresence Tasks," Dept. of Mech. Eng., Stanford Univ., 1994	
		Gotow et al. "Perception of Mechanical Properties at the Man-Machine Interface," IEEE CH2503 Jan. 1987, pp. 688-689	
		Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," Dept. of Mech. Eng., May 1990	
		Rosenberg, "A Force Feedback Programming Primer – for PC Gaming Peripherals Supporting I-Force 2.0 and Direct – X 5.0," Immersion Corp., 1997	
		Winey III, "Computer Simulated Visual and Tactile Feedback as an Aid to Manipulator and Vehicle Control," Dept. of Mech. Eng., MIT, June 1981	
		Payette et al., "Evaluation of a Force Feedback (Haptic) Computer Pointing Device in Zero Gravity, DSC-Vol. 58, Proc. of ASME Dynamics Systems and Control Div., Oct. 1996, pp. 547-553	

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		Ramstein, "Combining Haptic and Braille Technologies: Design Issues and Pilot Study," ACM 0-89791-776, pp. 37-44	
		Rosenberg et al., "The Use of Force Feedback to Enhance Graphical User Interfaces," Proc. SPIE 2653, 1996, pp. 243-248	
		Rosenberg et al., "Commercially Viable Force Feedback Controller for Individuals with Neuromotor Disabilities," USAF Armstrong Lab., May 1996	
		Schmult et al., "Application Areas for a Force-Feedback Joystick," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASM 1993, pp. 47-54	
		Tan et al., "Manual Resolution of Compliance When Work and Force Cues are Minimized," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME 1993, pp. 99-104	
		Burdea et al., "Distributed Virtual Force Feedback," IEEE Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation, May 1993	
		Fischer et al., "Specification and Design of Input Devices for Teleoperation," IEEE CH2876, Jan. 1990, pp. 540-545	
		Kotoku, "A Predictive Display with Force Feedback and its Application to Remote Manipulation System with Transmission Time Delay," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992	
		Jacobsen et al., "High Performance, High Dexterity, Force Reflective Teleoperator II," ANS Topical Mtg. On Robotics and Remote Systems, Fed. 1991	
		Ouh-young et al., "Using a Manipulator for Force Display in Molecular Docking," IEEE CH2555, 1988, pp. 1824-1829	
		Hannaford et al., "Performance Evaluation of a Six-Axis Generalized Force-Reflecting Teleoperator," IEEE Trans. On Systems, Man, and Cybernetics, Vol. 21, No. 3, May/June 1991	
		Hirota et al., "Development of Surface Display," IEEE 0-7803-1363, 1993, pp. 256-262	
		Ellis et al., "Design and Evaluation of a High-Performance Prototype Planar Haptic Interface," DSC-Vol. 49, Advances in Robotics, Mechatronics, and Haptic Interfaces, ASME Dec. 1993, pp. 55-64	
		Millman et al., "Design of a Four Degree of Freedom Force-Reflecting Manipulandum With a Specified Force/Torque Workspace," Proc. IEEE Int'l Conf. On Robotics and Automation, April 1991, pp. 1488-1493	
		Kelley et al., "MagicMouse: Tactile and Kinesthetic Feedback in the Human-Computer Interface Using an Electromagnetically Actuated Input/Output Device," Dept. of Elec. Eng., Univ. of British Columbia, Oct. 1993	
		Ouh-young et al., "Creating an Illusion of Feel: Control Issues in Force Display," Computer Science Dept., Univ. of North Carolina, Chapel Hill, Sept. 1989, pp. 1-14	
		Hannaford et al., "Force-Feedback Cursor Control," NASA Tech Brief, Vol. 13, No. 11, Item #21, Nov. 1989	
		Buttolo et al., "Pen-Based Force Display for Precision Manipulation in Virtual Environments," IEEE 0-8186-7084, Mar. 1995, pp. 217-224	
		Bejczy et al., "The Phantom Robot: Predictive Displays for Teleoperation with Time Delay," IEEE CH2870, Jan. 1990, pp. 546-550	
		Adelstein et al., "A High Performance Two Degree-of-Freedom Kinesthetic Interface," MIT, 1992, pp. 108-112	
		Kotoku et al., "Environment Modeling for the Interactive Display (EMID) Used in Telerobotic Systems," IEEE/RSJ Int'l Workshop on Intelligent Robots and Systems, Nov. 1991, pp. 999-1004	
		Su et al., "The Virtual Panel Architecture: A 3D Gesture Framework," IEEE 0-7803-1363, Jan. 1993, pp. 387-393	
		Yamakita et al., "Tele-Virtual Reality of Dynamic Mechanical Model," Proc. of IEEE/RSJ Int'l Conf. On Intelligent Robots and Systems, July 1992, pp. 1103-1110	
		Batter et al., "GROPE-I: A Computer Display to the Sense of Feel," Proc. IFIP Congress 1971, pp. 759-763	
		Adachi et al., "Sensory Evaluation of Virtual Haptic Push-Buttons," Technical Research Center, Suzuki Motor Corp., Yokohama, 1994	
		Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manuals Control Research," NASA-Ames Research Center/Dept. of Mech. Eng., MIT, 1992	
		Jones et al., "A Perceptual Analysis of Stiffness," Experimental Brain Research, 1990	
		Ouh-young, "Force Display in Molecular Docking," Dept. of Computer Science, Univ. of North Carolina, Chapel Hill, 1990	
		Yokokohji et al., "What You Can See is What You Can Feel – Development of a Visual/Haptic Interface to Virtual Environment," Proc. VRAIS 1996	

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		~~Kelley et al., "On the Development of a Force-Feedback Mouse and its Integration into a graphical user interface," 11/94, Engineering Congress and Exhibition, pp. 1-8~~
		~~Ramstein, "Combining Haptic & Braille Technologies: Design Issues and Pilot Study," 1996, Siggraph pp. 37-44~~
		~~Su et al., "The Virtual Panel Architecture: A 3D Gesture Framework," University of Maryland, pp. 387-393~~
		~~Ramstein et al., "The Pantograph: A Large Workspace Haptic Device for a Multimodal Human-Computer Interaction," Computer-Human Interaction, CHI 1994, pp. 1-3~~
		~~Munch et al., "Intelligent Control for Haptic Displays," Eurographics '96, Vol. 15, No. 3, 1996, pp. 217-226~~
		~~Colgate et al., "Implementation of Stiff Virtual Walls in Force-Reflecting Interfaces," Northwestern University, IL 1993, pp. 1-8~~
		~~Rosenberg et al. "Perceptual Decomposition of Virtual Haptic Surfaces," Proc. IEEE Symposium on Research Frontiers in Virtual Reality, 1993, pp. 1-8~~
		~~Iwata, Hiroo, "Pen-Based Haptic Virtual Environment," IEEE 0-7803-1363-1, 1993, pp. 287-292~~
		~~Baigrie, "Electric Control Loading – A Low Cost, High Performance Alternative," *Proceedings of Interservice/Industry Training Systems Conference*, pp. 247-254, November 6-8, 1990~~
		~~Iwata, "Pen-based Haptic Virtual Environment," 0-7803-1363-1/93 IEEE, pp. 287-292, 1993~~
		~~Russo, "The Design and Implementation of a Three Degree of Freedom Force Output Joystick," *MIT Libraries Archives* pp. 1-131, May 1990, archived 8/14/90~~
		~~Brooks et al., "Hand Controllers for Teleoperation – A State-of-the-Art Technology Survey and Evaluation," *JPL Publication 85-11*, NASA-CR-175890, N85-28659, pp. 1-84, 03/1/1985~~
		~~Jones et al., "A perceptual analysis of stiffness," ISSN 0014-4819 Springer International (Springer-Verlag); *Experimental Brain Research*, Vol. 79, No. 1, pp. 150-156, 1990~~
		~~Burdea et al., "Distributed Virtual Force Feedback, Lecture Notes for Workshop on Force Display in Virtual Environments and its Application to Robotic Teleoperation," *1993 IEEE International Conference on Robotics and Automation*, pp. 25-44, 05/02/1993~~
		~~Snow et al., "Model-X Force-Reflecting-Hand-Controller," NT Control No. NPO-17851; JPL Case No. 7348, pp. 1-4 with 45 pages of attachments, 06/15/1989~~
		~~Ouh-Young, "Force Display in Molecular Docking," Doctoral Dissertation, University of North Carolina at Chapel Hill, UMI Order No. 9034744, p. 1-369, 1990~~
		~~Tadros, "Control System Design for a Three Degree of Freedom Virtual Environment Simulator Using Motor/Brake Pair Actuators," *MIT Archive*, pp. 1-88, February 1990, archived 8/13/90~~
		~~Caldwell et al., "Enhanced Tactile Feedback (Tele-Taction) Using a Multi-Functional Sensory System," 1050-4729/93, pp. 955-960, 1993~~
		~~Adelstein et al., "Design and Implementation of a Force Reflecting Manipulandum for Manual Control research," DSC-Vol. 42, *Advances in Robotics*, pp. 1-12, 1992~~
		~~Gotow et al., "Controlled Impedance Test Apparatus for Studying Human Interpretation of Kinesthetic Feedback," WA11-11:00, pp. 332-337~~
		~~Stanley et al., "Computer Simulation of Interacting Dynamic Mechanical Systems Using Distributed Memory Parallel Processors," DSC-Vol. 42, *Advances in Robotics*, pp. 55-61, ASME 1992~~
		~~Russo, "Controlling Dissipative Magnetic Particle Brakes in Force Reflective Devices," DSC-Vol. 42, *Advances in Robotics*, pp. 63-70, ASME 1992~~
		~~Kontarinis et al. "Display of High-Frequency Tactile Information to Teleoperators," *Telemanipulator Technology and Space Telerobotics*, Won S. Kim, Editor, Proc. SPIE Vol. 2057, pp. 40-50, Sep. 7-9, 1993~~
		~~Patrick et al., "Design and Testing of A Non-reactive, Fingertip, Tactile Display for Interaction with Remote Environments," *Cooperative Intelligent Robotics in Space*, Rui J. deFigueiredo et al, Editor, Proc. SPIE Vol. 1387, pp. 215-222, 1990~~
		~~Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," *Ph.D. Dissertation*, Dept. of Mechanical Engineering, MIT, June 1989, archived 2/13/90~~
		~~Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," *Science*, Vol. 208, No. 4450, pp. 1327-1335, 1980~~
		~~Bejczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," *Proceedings Of Fourth CISM-IFToMM*, Sep. 8-12, 1981~~
		~~McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," *JPL* 1988, JPL D-5172~~

Examiner Signature	06/25/2006	Date Considered	06/25/2006

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INFORMATION DISCLOSURE STATEMENT BY APPLICANT				**Application Number**	
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Sheet	8	of	9	**Attorney Docket Number**	IMMR-046/02US

		Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," *Ph.D. Dissertation*, MIT, June 1995, archived 7/6/95	
		Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," *Intervention/ROV '91 Conference & Exposition*, Hollywood, Florida, May 21-23, 1991	
		Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," *Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration*, Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992	
		IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990	
		Terry et al., "Tactile Feedback In A Computer Mouse," *Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire*, March 10-11, 1988	
		Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," *Proceedings of the 1992 IEEE International Conference on Robotics and Automation*, Nice, France, May 1992	
		Eberhardt et al., "OMAR – A Haptic display for speech perception by deaf and deaf-blind individuals," *IEEE Virtual Reality Annual International Symposium*, Seattle, WA, Sep. 18-22, 1993	
		Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contactor area," *Journal of The Acoustical Society of America*, Vol. 82, No. 4, October 1987	
		Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," *International Computer Technology Conference, The American Society of Mechanical Engineers*, San Francisco, CA, August 12-15, 1980	
		Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," *SOAR '89 Workshop, JSC*, Houston, TX, July 25-27, 1989	
		Oubyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," *IEEE Transactions on Consumer Electronics*, Vol. 41, No. 3, August 1995	
		Marcus, "Touch Feedback in Surgery," *Proceedings of Virtual Reality and Medicine The Cutting Edge*, Sep. 8-11, 1994	
		Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987	
		SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994	
		"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages)	
		"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (23 pages).	
		Adelstein, "A Virtual Environment System For The Study of Human Arm Tremor," *Ph.D. Dissertation*, Dept. of Mechanical Engineering, MIT, June 1989, archived 2/13/90	
		Bejczy, "Sensors, Controls, and Man-Machine Interface for Advanced Teleoperation," *Science*, Vol. 208, No. 4450, pp. 1327-1335, 1980	
		Beiczy et al., "Generalization of Bilateral Force-Reflecting Control of Manipulators," *Proceedings Of Fourth CISM-IFToMM*, Sep. 8-12, 1981	
		McAffee et al., "Teleoperator Subsystem/Telerobot Demonstrator: Force Reflecting Hand Controller Equipment Manual," *JPL 1988, JPL D-5172*	
		Minsky, "Computational Haptics: The Sandpaper System for Synthesizing Texture for a Force-Feedback Display," *Ph.D. Dissertation*, MIT, June 1995, archived 7/6/95	
		Jacobsen et al., "High Performance, Dextrous Telerobotic Manipulator With Force Reflection," *Intervention/ROV '91 Conference & Exposition*, Hollywood, Florida, May 21-23, 1991	
		Shimoga, "Finger Force and Touch Feedback Issues in Dexterous Telemanipulation," *Proceedings of Fourth Annual Conference on Intelligent Robotic Systems for Space Exploration*, Rensselaer Polytechnic Institute, Sep. 30-Oct. 1, 1992	
		IBM Technical Disclosure Bulletin, "Mouse Ball-Actuating Device With Force and Tactile Feedback," Vol. 32, No. 9B, February 1990	
		Terry et al., "Tactile Feedback In A Computer Mouse," *Proceedings of Fourteenth Annual Northeast Bioengineering Conference, University of New Hampshire*, March 10-11, 1988	
		Howe, "A Force-Reflecting Teleoperated Hand System for the Study of Tactile Sensing in Precision Manipulation," *Proceedings of the 1992 IEEE International Conference on Robotics and Automation*, Nice, France, May 1992	
		Eberhardt et al., "OMAR – A Haptic display for speech perception by deaf and deaf-blind individuals," *IEEE Virtual Reality Annual International Symposium*, Seattle, WA, Sep. 18-22, 1993	
		Rabinowitz et al., "Multidimensional tactile displays: Identification of vibratory intensity, frequency, and contactor area," *Journal of The Acoustical Society of America*, Vol. 82, No. 4, October 1987	
		Bejczy et al., "Kinesthetic Coupling Between Operator and Remote Manipulator," *International Computer Technology*	

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		~~*Conference, The American Society of Mechanical Engineers*, San Francisco, CA, August 12-15, 1988~~	
		~~Bejczy et al., "A Laboratory Breadboard System For Dual-Arm Teleoperation," *SOAR '89 Workshop*, JSC, Houston, TX, July 25-27, 1989~~	
		~~Ouhyoung et al., "A Low-Cost Force Feedback Joystick and Its Use in PC Video Games," *IEEE Transactions on Consumer Electronics*, Vol. 41, No. 3, August 1995~~	
		~~Marcus, "Touch Feedback in Surgery," *Proceedings of Virtual Reality and Medicine The Cutting Edge*, Sep. 8-11, 1994~~	
		~~Bejczy, et al., "Universal Computer Control System (UCCS) For Space Telerobots," CH2413-3/87/0000/0318501.00 1987 IEEE, 1987~~	
		~~SCANNELL, "Taking a Joystick Ride," Computer Currents, Boston Edition, Vol. 9, No. 11, November 1994~~	
		~~"Component Maintenance Manual With Illustrated Parts List, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 28 January 2002 (3 pages)~~	
		~~"Technical Manual Overhaul Instructions With Parts Breakdown, Coaxial Control Shaker Part No. C-25502," Safe Flight Instrument Corporation, Revised 15 July 1980 (33 pages)~~	

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Sheet 1 of 3

Complete if Known	
Application Number	10/782,939
Filing Date	February 23, 2004
First Named Inventor	Erik J. Shahoian
Art Unit	2674
Examiner Name	Unassigned
Attorney Docket Number	IMMR046/02US

U.S. PATENT DOCUMENTS

Examiner	Cite No.[1]	Document Number Number Kind Code[2] (*if known*)	Publication Date MM-DD-YYYY	Name of Patentee or Applicant of Cited Document	Pages, Columns, Lines, Where Relevant Passages or Relevant Figures Appear
XW		6,422,941	7/23/2002	Thorner et al.	
		6,219,034	04/17/2001	Elbing et al.	
		6,160,489	12/12/2000	Perry et al.	
		6,111,577	8/29/2000	Zilles et al.	
		5,766,016	6/16/1998	Sinclair	
		5,690,582	11/25/1997	Ulrich et al.	
		5,575,761	11/19/1996	Hajianpour	
		5,437,607	8/1/1995	Taylor	
		5,436,622	7/25/1995	Gutman et al.	
		5,283,970	2/8/1994	Algner	
		5,186,695	2/16/1993	Mangseth et al.	
		5,175,459	12/29/1992	Danial et al.	
		5,165,897	11/24/1992	Johnson	
		5,022,384	6/11/1991	Freels	
		4,885,565	12/5/1989	Embach	
		4,484,191	11/20/1984	Vavra	
		4,464,117	8/7/1984	Foerst	
		4,333,070	6/1/1982	Barnes	
		4,262,549	4/21/1981	Schwellenbach	
		4,127,752	11/28/1978	Lowthorp	
		2,972,140	2/14/1961	Hirsch	

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OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
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		~~PATRICK, "Design, Construction, and Testing of a Fingertip Tactile Display for Interaction with Virtual and Remote Environments," Master of Science Thesis, MIT, Aug. 1990, archived Nov. 8, 1990.~~	
		~~CALDER, "Design of A Force-Feedback Touch-Introducing Actuator For Teleoperator Robot Control," Bachelor of Science Thesis, MIT, May 1983, archived June 23, 1983.~~	
		~~WIKER, "Teletouch Display Development: Phase 1 Report," Technical Report 1230, Naval Ocean Systems Center, San Diego, July 1988.~~	
		~~BLISS, "Optical-to-Tactile Image Conversion for the Blind," IEEE Transactions on Man-Machine Systems, Vol. MMS-11, No. 1, March 1970.~~	
		~~JOHNSON, "Shape-Memory Alloy Tactile Feedback Actuator," Armstrong Aerospace Medical Research Laboratory, AAMRL-TR-88-008, August, 1988.~~	
		~~KONTARINIS et al., "Tactile Display of Vibratory Information in Teleoperation and Virtual Environments," PRESENCE, 4(4):387-402, Harvard Univ., 1995.~~	
		~~AUKSTAKALNIS et al., "Silicon Mirage: The Art and Science of Virtual Reality," ISBN 0-938151-82-7, pp. 129-180, 1992.~~	
		~~EBERHARDT et al., "Inducing Dynamic Haptic Perception by The Hand: System Description and Some Results," DSC-Vol. 55-1, Dynamic Systems and Control: Volume 1, ASME 1994.~~	
		~~GOBEL et al., "Tactile Feedback Applied to Computer Mice," International Journal of Human-Computer Interaction, Vol. 7, No. 1, pp. 1-24, 1995.~~	
		~~PIMENTEL et al., "Virtual Reality: through the new looking glass," 2nd Edition; McGraw-Hill, ISBN 0-07-050167-X, pp. 41-202, 1994.~~	
		"Cyberman Technical Specification," *Logitech Cyberman SWIFT Supplement to Logitech Mouse Technical Reference and Programming Guide*, April 1994.	
		~~OUHYOUNG et al., "The Development of A Low-Cost Force Feedback Joystick and Its Use in the Virtual Reality Environment," Proceedings of the Third Pacific Conference on Computer Graphics and Applications, Pacific Graphics '95, Seoul, Korea, 21-24 August 1995.~~	
		~~KACZMAREK et al., "Tactile Displays," Virtual Environment Technologies, Chap. 9, pp. 349-414.~~	
		~~LAKE, "Cyberman from Logitech," at http://www.ibiblio.org/GameBytes/issue21/hw/cyberman.html, 1994.~~	
		~~YAMAKITA et al., "Tele-Virtual Reality of Dynamic Mechanical Model," Proceedings of the 1992 IEEE/RSJ International Conference on Intelligent Robots and Systems, Raleigh, NC, July 7-10, 1992~~	

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OTHER PRIOR ART – NON PATENT LITERATURE DOCUMENTS			
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		~~NOLL, "Man-Machine Tactile," SID Journal, July/August 1972 Issue~~	
		~~ROSENBERG, "Virtual Fixtures: Perceptual Overlays Enhance Operator Performance In Telepresence Tasks," Ph.D. Dissertation, Stanford University, June 1994~~	

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Information Disclosure Statement by Applicant	Applicant: Erik J. Shahoian et al.	
(Use several sheets if necessary)	Filed: February 23, 2004	Group: 2674

U.S. Patent Documents

Init.		Document No.	Date	Name	Class	Subclass	Filing Date
XW	A	RE34,095	10/13/1992	Padula et al.			
XW	B	2004/0075676	04/22/2004	Rosenberg et al.			
XW	C	6,429,846	08/06/2002	Rosenberg et al.			

Foreign Documents

Init.		Document No.	Date	Country	Class	Subclass	Translation Yes	Translation No

Other Documents (Including Author, Title, Date, Pertinent Pages, etc.)

XW	D	International Search Report for International Application No. PCT/US2005/036861, date of mailing February 23, 2006.

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